a) inserting a polymer membrane into a vacuum chamber and irradiating the surface of the polymer membrane with energized cationic particles under a high vacuum; and

b) treating the surface-activated polymer membrane obtained in step a) by infusing a reactive gas onto the surface of the polymer membrane to cause reaction of the gas with the polymer membrane surface, wherein the ~~cationic beam~~ irradiation of step a) and reactive gas infusion of step b) are sequentially made.

17. (Twice-Amended) The method in accordance with claim 15, wherein the reactive gas infusion of step b) is made without interference of the cationic particles.

19. (Twice-Amended) The method in accordance with claim 15, wherein energized cationic particles of step a) are irradiated on one side or two sides of the polymer membrane.

20. (Twice-Amended) The method in accordance with claim 15, wherein the cationic particles of step a) are produced from one or more ion generating gases selected from the group consisting of hydrogen, oxygen, helium, nitrogen, oxygen, air, fluorine, neon, argon, krypton, N_20, and their mixtures.

22. (Twice-Amended) The method in accordance with claim 15, wherein the energy of cationic particles of step a) is from 10^{-2} to 10^{7} keV.

23. (Twice-Amended) The method in accordance with claim 15, wherein the high vacuum of step a) is 10^{-2} to 10^{-8} torr.

31. (Twice-Amended) A method for providing hydrophilicity or increased hydrophobicity to the surface of a polymer comprising:

a) inserting a polymer into a vacuum chamber and irradiating the surface of the polymer with energized cationic particles under high vacuum; and

b) treating the surface-activated polymer obtained in step a) by infusing a reactive gas onto the surface of the polymer to cause reaction of the gas with the polymer surface, wherein the cationic beam irradiation of step a) and reactive gas infusion of step b) are sequentially made.

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